

in a single sharp spine; teeth 6 to 8 above, 3 to 4 below. Last three pairs of thoracic feet longer and more slender than in *S. ochotensis*; sixth abdominal segment longer, being more than one and a half times as long as the fifth segment.

*Dimensions*.—Female, approximate length 38 mm., length of carapace and rostrum 13.6 mm., of rostrum 6 mm.

*Type locality*.—Coal Harbor, Unga Island, Alaska, 8 to 9 fathoms, W. H. Dall, collector (Cat. No. 25262).

*Distribution*.—Alaska, 6 to 20 fathoms.

#### SPIRONTOCARIS UNALASKENSIS.

Agrees with *S. polaris* (Sabine) and differs from all other species which possess a supraorbital spine, in the maxilliped being without an exognath, while it and the first two pairs of feet are provided with an epipod. Female: Posterior median spine of carapace situated at the anterior third (rostrum excluded). Rostrum longer than acicle, dorsal spines 4 or 5, 2 on carapace and 2 or 3 at base of rostrum; no upper limb on distal portion, lower limb shallow, convex, 3-spined in front of middle. Eyes large, pyriform. Third segment of antennules less than half as long as second. Antennal peduncle extending nearly to end of second segment of antennular peduncle. Hinder portion of third abdominal segment very prominent; sixth segment about one and two-thirds times as long as fifth.

*Dimensions*.—Female, length 60 mm., carapace and rostrum 26.5 mm., rostrum 14.5 mm.

*Type locality*.—North of Unalaska, 350 fathoms, station 3331, U. S. Fish Commission steamer *Albatross* (Cat. No. 25263).

#### SPIRONTOCARIS VICINA.

Allied to the preceding; second foot without an epipod.

*Female*.—Dorsal spines 7 or 8 (2 on carapace), the anterior not very near tip of rostrum; inferior spines 4. Second segment of antennular peduncle about three times as long as third; basal scale falls considerably short of second joint of peduncle. Antennal peduncle does not reach middle of second segment of antennular peduncle.

*Dimensions*.—A female with rostrum and telson incomplete measures 39 mm. from the orbit to the end of the sixth abdominal somite.

*Type locality*.—North of Unalaska, 309 fathoms, station 3316, U. S. Fish Commission steamer *Albatross* (Cat. No. 25264).

#### SPIRONTOCARIS WASHINGTONIANA.

*Female*.—Posterior median spine at anterior fourth of carapace (rostrum excluded). Rostrum slender, half as long as carapace, nearly horizontal, slightly sinuous, dorsal spines 4 (2 on carapace), 3 teeth below on anterior third. Second segment of antennular peduncle

three times as long as third; basal scale two-thirds as long as first segment. Acicle two-thirds as long as carapace, oblong-lanceolate; peduncle reaching middle of acicle. Outer maxilliped extends beyond antennal scale by half the length of its last segment; without exopod, but with an epipod; first three pairs of feet with epipods.

*Dimensions*.—Female, length 39 mm., of carapace and rostrum 14 mm., of rostrum 5 mm.

*Type locality*.—Off Sea Lion Rock, Washington, 685 fathoms, station 3071, U. S. Fish Commission steamer *Albatross* (Cat. No. 25265).

*b. Species having no supraorbital spine.*

#### SPIRONTOCARIS FLEXA.

Very near *S. gracilis* (Stimpson); differs chiefly in longer basal scale of antennula, reaching a little beyond first segment, in lower position of pterygostomial spine, in the presence of epipods on the maxilliped and first two pairs of feet.

*Dimensions*.—Female, length 54 mm., of carapace and rostrum 20 mm., of rostrum 11.5 mm.

*Type locality*.—North of Bird Island, Shumagins, Alaska, 21 fathoms, station 2850, U. S. Fish Commission steamer *Albatross* (Cat. No. 25266).

*Distribution*.—From Bering Sea to Drakes Bay, California, 10 to 93 fathoms.

#### SPIRONTOCARIS DECORA.

Rostrum longer than carapace, 4 to 5 superior teeth (1 to 2 on carapace), anterior tooth in front of middle of rostrum; rostrum less slender than in *S. gracilis* or *S. flexa*, a little concave above, nearly horizontal; 6 to 8 teeth below. Maxilliped without exognath, but with an epipod; no epipods on feet. Posterior margin of third abdominal segment strongly produced at the middle, but the segment is not laterally pinched or carinated; sixth segment longer than seventh.

*Dimensions*.—Female, approximate length 47 mm., length of carapace and rostrum 16.4 mm., of rostrum 9 mm.

*Type locality*.—Off Santa Cruz Island, California, 150 fathoms, station 2946, U. S. Fish Commission steamer *Albatross* (Cat. No. 25267).

*Distribution*.—From Straits of Fuca to San Diego, California, 50 to 171 fathoms.

#### SPIRONTOCARIS TRIDENS.

Allied to *S. gracilis*, *S. flexa*, and *S. decora*, but stouter. Superior teeth 3, 1 on carapace and 2 at base of rostrum; inferior 3 to 6. Basal scale of antennules with a spine which extends nearly to end of second segment. Acicle, measured along its outer margin, a little shorter than carapace. Third abdominal somite well produced backward and

its posterior portion carinated, the carina defined on either side by a deep groove like the imprint of a nail.

*Dimensions*.—Female, approximate length 61 mm.; length of carapace and rostrum 22 mm., of rostrum 12.5 mm.

*Type locality*.—Admiralty Inlet, Puget Sound, 40 fathoms, station 2865, U. S. Fish Commission steamer *Albatross* (Cat. No. 25268).

*Distribution*.—From Aleutian Islands to Washington, to a depth of 48 fathoms.

#### SPIRONTOCARIS TOWNSENDI.

Closely allied to *S. gaimardii*, and may be compared with *S. gaimardii belcheri* (Bell), which is the only form of *S. gaimardii* known to occur on the Pacific coast, and which ranges from the Arctic shores of Alaska and Siberia southward to Sitka.

In the female of *S. townsendi*, the rostrum reaches almost or quite to the end of the acicle and is armed above with 5 to 7 spines (2 on carapace), below with 3 to 6 spines; lower limb deeper than in *S. gaimardii belcheri*; rostrum nearly straight. Pterygostomial spine very small. Scale at base of antennula reaches end or nearly to end of second segment; second segment scarcely longer than third. Antennal scale almost as long as carapace. The maxillipeds reach to distal fourth of antennal scale; the fifth pair of feet do not attain end of maxilliped.

Third abdominal segment smoothly rounded, without lobe or angle in a profile view; posterior margin produced moderately backward at the middle. Fourth segment devoid of a lateral spine; telson provided with 3 or 4 lateral spinules on each side.

*Dimensions*.—Female, approximate length 60.5 mm.; length of carapace and rostrum 20 mm., of rostrum 10.6 mm.

*Type locality*.—Washington Sound, Straits of Fuca, 48 fathoms, station 2864, U. S. Fish Commission steamer *Albatross* (Cat. No. 25269).

*Distribution*.—From Bering Sea to Puget Sound, 21 to 114 fathoms.

#### SPIRONTOCARIS MOSERI.

Of the *gaimardii* group, but the maxilliped is without exognath, and the maxilliped and the first foot only are provided with an epipod. Rostrum about as long as or longer than carapace; teeth 6 to 8 above (2 on carapace), 4 to 7 below. Antennal spine strong; pterygostomial small. Eyes large, pyriform. The antennular peduncle reaches to the middle or the distal third of antennal scale; second segment a little longer than third; spine of basal scale reaches to middle of second segment. Antennal peduncle very stout and nearly as long as antennular; scale narrow-ovate, its outer margin about five-sevenths as long as carapace. The maxillipeds exceed the scale by one-fourth or more of the length of the last segment. The first pair of feet overreach the

antennular peduncle, the second pair reach tip of maxillipeds, the fifth pair extend to or beyond end of antennal scale. Dactyli of third, fourth, and fifth pairs short, very stout, and armed with strong spines. Upper margin of third abdominal segment in profile smoothly rounded; posteriorly the segment is strongly produced over the fourth, which has a spine on either side; sixth twice as long as fifth; seventh longer than sixth; 4 or 5 lateral spines.

*Dimensions*.—Female, length 57 mm.; length of carapace and rostrum 22.7 mm., of rostrum 11.5 mm.

*Type locality*.—Off Segouam, Aleutians, 283 fathoms, station 3480, U. S. Fish Commission steamer *Albatross* (Cat. No. 25270).

*Distribution*.—Bering Sea, southward and eastward to Washington, 60 to 516 fathoms.

#### SPIRONTOCARIS MAXILLIPES.

Very near *S. moseri*, but distinguished as follows: Rostrum shorter, about four-fifths as long as carapace, teeth 5 to 8 above, 2 to 6 below. The antennular peduncle reaches two-thirds or more of the length of the antennal scale; second segment a little longer than in *S. moseri*; spine of basal scale scarcely reaches middle of second segment, or may not extend beyond first. The antennal peduncle does not reach beyond second segment of the antennular; scale about two-thirds length of carapace. More than one-half of the last segment of outer maxilliped extends beyond scale. No epipods on feet. Minute spinule on fourth abdominal somite; sixth somite one and a half times fifth; spinules of telson commonly three on each side.

*Dimensions*.—Female, length 48.9 mm.; length of carapace and rostrum 18.4 mm., of rostrum 8.6 mm.

*Type locality*.—Off Segouam, Aleutians, 283 fathoms, station 3480, U. S. Fish Commission steamer *Albatross* (Cat. No. 25271).

*Distribution*.—Also taken at stations 3330, 3331, and 3338; depth, 350 to 625 fathoms.

#### SPIRONTOCARIS BRACHYDACTYLA.

Closely allied to the three immediately preceding, but distinguished from them by the short fingers of the first chelipeds, which are not more than a third as long as the palm. Rostrum distinctly shorter than carapace, 6 teeth above (1 on carapace), 3 below. No pterygos-tomial spine. Like *S. maxillipes*, the feet are devoid of epipods.

*Dimensions*.—Length of ovigerous female, exclusive of rostrum and telson, 24.8 mm.; length of carapace (rostrum excluded) 7.7 mm.

*Distribution*.—Southern California, 266 to 417 fathoms; type locality, off Santa Cruz Island, 266 fathoms, station 2948, U. S. Fish Commission steamer *Albatross* (Cat. No. 25272).

## SPIRONTOCARIS KINCAIDI.

Near *S. camtschatica* (Stimpson). Rostrum one-third longer than carapace, horizontal, slightly concave above, 5 teeth above (2 on carapace), 5 teeth below. Antennular peduncle reaching about two-fifths length of antennal scale, second and third segments very short and subequal, basal scale reaching end of second segment. Antennal peduncle almost as long as antennular, scale tapering, exceeding the carapace. No exognath, but an epignath on maxilliped. No epipods on feet. Abdomen strongly bent at third somite, which is produced backward in a strong lobe; fourth somite spineless.

*Dimensions*.—Ovigerous female, approximate length 36.5 mm.; length of carapace and rostrum 13.6 mm., of rostrum 7.7 mm.

*Type locality*.—Off Santa Cruz, California, 21 fathoms, station 3124, U. S. Fish Commission steamer *Albatross* (Cat. No. 25273).

*Distribution*.—Also taken on coast of Washington in 37 to 40 fathoms.

## SPIRONTOCARIS BIUNGUIS.

Also of the *gaimardii* type, but easily distinguished by the very large, pyriform eyes, the cornea covering the greater part of the peduncle, by the longer rostrum, which is from one and a fourth to one and two-thirds times as long as the remainder of the carapace, by the maxilliped possessing an exopod and an epipod, while the feet are destitute of epipods, and by the dactyli of the last three pairs of feet armed with a long subterminal spinule, which, folding against the slender tip of the dactylus, gives the appearance of a minute chela.

*Dimensions*.—Length of egg-laden female 83 mm., length of carapace and rostrum 37.6 mm., length of rostrum 23.2 mm.

*Type locality*.—Off Cape St. James, Queen Charlotte Islands, British Columbia, 876 fathoms, station 2860, U. S. Fish Commission steamer *Albatross* (Cat. No. 25274).

*Distribution*.—From Bering Sea to Oregon, 109 to 987 fathoms.

## SPIRONTOCARIS STONEYI.

A small species near *S. cristata* (Stimpson). Rostrum about half as long as carapace, upper margin convex, armed with 7 to 9 teeth (1 to 2 on carapace), unarmed and straight near tip; tip pointed; one tooth near tip below. A strong antennal, a slender pterygostomial spine. Antennular peduncle reaching to middle of antennal scale; second segment one and a half times as long as third; outer scale not reaching end of first segment. Antennal scale as long as carapace, spine reaching as far as blade; peduncle reaching to a little beyond first segment of antennular peduncle. Fourth abdominal somite



unarmed; sixth somite more than one and a half times as long as fifth and equal to the telson, which has three pairs of lateral spines.

*Dimensions*.—Female, length 20 mm., length of carapace and rostrum 5.5 mm., of rostrum 1.8 mm.

*Type locality*.—Bering Sea, latitude  $62^{\circ} 15'$  north, longitude  $167^{\circ} 48'$  west,  $20\frac{1}{2}$  fathoms, Lieut. George M. Stoney, U. S. N., collector, June, 1884 (Cat. No. 25275).

#### SPIRONTOCARIS MACROPHTHALMA.

Allied to *S. macilentus* (Krøyer) and *S. bispinosa* Holmes. Rostrum about three-fourths or five-sixths as long as carapace, upper and lower limbs with convex margins and widest at about the middle of their length; 10 to 14 teeth above (2 or 3 on carapace), 1 to 3 spines below; tip acute. No supraorbital nor pterygostomian spine. Eyes large, pyriform, corneae extending almost to base of eyestalk on inner side, eye reaching two-thirds length of first antennular segment; this segment twice as long as second, and second three times as long as third. The blade of the antennal scale exceeds the spine considerably, and is most advanced toward its inner margin. Outer maxillipeds slender, reaching midway between end of antennal peduncle and end of scale. Last three pairs of feet long, fragile, unarmed.

Differs from *S. macilentus* in the much larger eyes, longer rostrum, of which the upper limb is narrowed at its base; from *S. bispinosa* in the absence of a supraorbital spine and of the long slender process of the rostrum.

*Dimensions*.—Female, length 62.6 mm., length of carapace and rostrum 24 mm., of rostrum 11 mm.

*Type locality*.—Off Tawhit Head, Washington, 178 fathoms, station 3076, U. S. Fish Commission steamer *Albatross* (Cat. No. 25276).

*Distribution*.—Ranges from Unalaska to California, 178 to 636 fathoms.

#### Family PANDALIDÆ.

##### PANDALUS JORDANI.

Near *P. borealis* Krøyer. Rostrum similar to that of *P. borealis*, 14 to 17 spines above (4 on carapace), 7 to 10 below. Blade and spine of acicle equally advanced. Carpus of right cheliped of second pair divided into 19 to 22 segments; of left cheliped, into 58 to 63 segments. Dactyli of last three pairs of feet contained from  $2\frac{1}{2}$  to  $2\frac{3}{4}$  times in their propodi. Third abdominal somite carinated in its posterior half, and with a slight lobe at the posterior third, which may almost disappear in large specimens.

*Dimensions*.—Ovigerous female, length 124.5 mm., length of carapace and rostrum 59.5 mm., of rostrum 38 mm.

*Type locality*.—Off Santa Cruz Island, California, 155 fathoms, station 2949 (Cat. No. 25277).

*Distribution*.—From Unalaska to southern California, 35 to 178 fathoms.

#### PANDALUS MONTAGUI TRIDENS.

Differs from *P. montagui* Leach of the North Atlantic in its somewhat longer rostrum, which varies from  $1\frac{1}{2}$  to  $1\frac{2}{3}$  times length of carapace, the dorsal spines terminate behind the middle of the rostrum and the tip is usually trifid, while in typical *P. montagui* the rostrum is from  $1\frac{2}{3}$  to  $1\frac{1}{2}$  times the carapace, its dorsal spines reach to or in front of the middle, and the tip is bifid.

*Dimensions*.—Female, length 104 mm., length of carapace and rostrum 48.5 mm., of rostrum 30.2 mm.

*Type locality*.—Off North Head, Akutan Island, Alaska, 72 fathoms, station 2842, U. S. Fish Commission steamer *Albatross* (Cat. No. 25278).

*Distribution*.—From Bering Sea to Point Arena, California, 3 to 351 fathoms, abundant.

#### PANDALUS STENOLEPIS.

Near *P. danæ* Stimpson. Differs in the stouter eyes, the transverse diameter as great as axial diameter; in the more slender acicle, which has a concave outer margin, and distal half of blade very narrow and filiform, narrower than adjacent thickened portion; in the longer feet of first pair, reaching almost to extremity of maxillipeds; in the third, fourth, and fifth pairs of feet of the male, which, while shorter than those of the female, as in *P. danæ*, do not, as in that species, differ in shape from those of the female; in the tip of the rostrum, usually two-spined instead of three-spined.

*Dimensions*.—Adult female, length 80 mm., length of carapace and rostrum 37.2 mm., of rostrum 21 mm.

*Type locality*.—Straits of Fuca, 40 fathoms, station 3464, U. S. Fish Commission steamer *Albatross* (Cat. No. 25279).

*Distribution*.—From Aleutian Islands to Oregon, 27 to 125 fathoms.

#### PANDALOPSIS ALEUTICA.

Allied to *P. ampla* Bate and *P. lamelligera* (Brandt). Surface pubescent. A curved, longitudinal branchial ridge present. Superior spines 8 to 13, 4 to 6 behind orbits, the insertion of the posterior spine at middle of carapace, anterior spine (exclusive of a subterminal spine) behind middle of rostrum; inferior spines 8 to 12. Peduncle of antennula extends a little past middle of antennal scale; second segment  $1\frac{1}{2}$  times as long as third. Peduncle of antenna reaching to end of second segment of antennula; scale three-fourths to four-fifths as long as carapace, broader behind than in *P. ampla*. The outer